

Massachusetts Institute of Technology  
Instrumentation Laboratory  
Cambridge, Massachusetts

LUMINARY Memo #116

To: Distribution  
From: L. Berman  
Date: 22 October 1969  
Subject: ACB #L5/120 - Operation of Rotation Control

The rotation control sequence used to prevent the body x-axis from pitching through the downward vertical was written on the assumption that UNFC/2 was a unit vector. The unitizing operation was deleted from Luminary since FINDCDUW does it anyway. The formula used for release is:

$$\bar{A}_T \times 2^9 \cdot \bar{X}_{NB} \times 2^{-1} > \cos \theta_C \times 2^{-2}$$

$$\text{since } \bar{UNFC}/2 = \bar{A}_T \times 2^9$$

$$(\bar{A}_T \times 2^9) \cdot \bar{X}_{NB} > 1/2 \cos \theta_C$$

$$(A_T \times 2^9) \cos \theta > 1/2 \cos \theta_C$$

Now,  $A_T \times 2^9$ , instead of having a magnitude of 1/2, varies from .15 to .30, with the result that  $\cos \theta$  must be larger than  $\cos \theta_C$ , or that  $\theta$  must be smaller than  $\theta_C$ . The attached figure shows the range of variation.

# Rotation Control Release Angle vs Commanded Release Angle

